

TABLE 3.—Summary of U.S. Bureau of Plant Industry evaporation records, April–September, inclusive—Continued

Moro, Oreg.; lat. 45°40'; elevation 1,800 feet—Continued

Year	Diameter of pan, feet	Θ_a	V	W	E.
1	2	3	4	5	6
1921	6	58.8		6.6	42.18
1922	6	59.7		8.6	47.13
1923	6	60.2		6.8	42.50
1924	6	60.7		8.4	52.34
1925	6	61.3		6.6	42.37
1926	6	61.5		7.7	48.45
1927	6	59.0		6.8	40.44
1928	6	60.2		8.8	45.41
1929	6	60.5		8.7	43.45
1930	6	61.1		9.9	43.70
1931	6	61.3		8.5	43.90
1932	6				
15-year average, 1917–31		60.2		7.7	44.236

North Platte, Nebr.; lat. 41°20'; elevation 2,841 feet

1908	8	63.7	0.424	8.1	41.936
1909	8	62.8	.425	7.4	40.423
1910	8	64.0	.386	8.4	46.564
1911	8	65.2	.415	9.0	49.702
1912	8	62.8	.406	7.8	41.678
1913	8	66.2	.426	8.3	51.456
1914	8	66.5	.432	7.7	47.436
1915	6	61.3	.411	6.5	35.469
1916	6	63.8	.384	7.5	43.603
1917	6	62.2	.392	7.3	40.578
1918	6	63.8	.392	7.3	41.849
1919	6	65.0	.418	6.7	40.126
1920	6	62.5	.382	6.1	36.376
1921	6	65.8	.415	7.0	42.782
1922	6	66.2	.421	6.6	40.973
1923	6	62.6	.424	6.3	34.209
1924	6	61.8	.368	7.4	38.705
1925	6	66.0	.404	7.2	41.512
1926	6	64.6	.400	6.9	42.229
1927	6	63.2	.390	7.2	36.476
1928	6	62.2	.386	6.6	37.681
1929	6	64.2	.406	7.0	38.128
1930	6	65.5	.408	6.3	35.364
1931	6	66.3	.394	6.7	45.897
1932	6	66.5	.417	7.9	43.729
15-year average, 1917–31		64.1	.400	6.8	39.326
20-year average, 1913–32		64.3	.404	7.0	40.720

Sheridan, Wyo.; lat. 44°40'; elevation 3,790 feet

1917	6	57.5	0.277	5.1	³⁸ 37.027
1918	6	58.5	.316	4.4	31.567
1919	6	63.5	.265	4.8	43.663
1920	6	57.3	.314	4.3	30.472
1921	6	60.3	.285	5.8	39.238
1922	6	59.7	.321	3.6	31.086
1923	6	59.3	.318	4.1	31.581
1924	6	56.7	.272	3.6	29.424
1925	6	60.3	.312	4.0	37.840
1926	6	59.3	.284	4.0	33.499
1927	6	56.3	.309	3.8	27.087
1928	6	57.7	.287	3.9	30.866
1929	6	58.5	.281	4.0	32.548
1930	6	62.0	.307	4.4	36.845
1931	6	62.7	.277	4.4	40.850
1932	6	61.2	.306	4.1	35.220
15-year average, 1917–31		59.3	.295	4.3	34.420

³⁸ April missing. Mean of 15 years data. Prorated for 6 months.

TABLE 3.—Summary of U.S. Bureau of Plant Industry evaporation records, April–September, inclusive—Continued

Tucumcari, N.Mex.; lat. 35°30'; elevation 4,194 feet

Year	Diameter of pan, feet	Θ_a	V	W	E.
1	2	3	4	5	6
1913	6	69.7	0.341	6.4	54.686
1914	6	70.2	.414	6.0	49.137
1915	6	69.0	.354	6.1	52.503
1916	6	70.7	.315	6.5	58.901
1917	6	69.8	.324	6.7	63.461
1918	6	70.8	.328	7.7	64.683
1919	6	68.5	.485	5.2	45.788
1920	6	65.2	.420	5.4	48.849
1921	6	70.0	.417	4.7	48.102
1922	6	72.3	.359	5.4	57.679
1923	6	70.5	.378	5.4	55.016
1924	6	69.8	.360	5.4	56.030
1925	6	71.5	.377	6.0	56.841
1926	6	68.8	.368	4.8	49.163
1927	6	71.5	.340	6.0	59.798
1928	6	69.8	.367	5.2	52.704
1929	6	70.0	.376	5.8	53.405
1930	6	72.2	.350	5.7	56.365
1931	6	69.8	.424	4.9	49.848
1932	6	70.5	.400	5.3	54.381
15-year average, 1917–31		70.0	.378	5.6	54.515
20-year average, 1913–32		70.0	.375	5.7	54.376

Williston, N.Dak.; lat. 48°00'; elevation 1,875 feet

1909	8	57.0	0.409	6.3	32.586
1910	8	59.3	.306	6.6	37.981
1911	8	57.7	.315	6.9	37.105
1912	8	57.3	.346	5.8	29.078
1913	8	59.8	.356	5.8	35.479
1914	8	59.0	.378	5.0	32.205
1915	8	57.2	.336	5.7	30.454
1916	8	56.7	.345	5.8	29.940
1917	8	58.2	.358	6.0	33.143
15-year average, ³⁹ 1917–31		58.5	.357	5.3	33.650

Woodward, Okla.; lat. 36°30'; elevation 1,900 feet

1914	6	73.7	0.482	8.5	52.647
1915	6	69.3	.500	7.2	41.662
1916	6	71.7	.462	8.0	53.926
1917	6	70.8	.441	7.8	49.865
1918	6	72.3	.442	7.2	49.779
1919	6	71.2	.535	6.8	45.321
1920	6	70.3	.493	7.7	48.150
1921	6	73.2	.518	7.0	50.613
1922	6	73.8	.516	6.6	57.813
1923	6	72.5	.515	6.9	49.111
1924	6	71.5	.472	7.0	49.219
1925	6	74.3	.572	6.5	50.953
1926	6	71.2	.557	6.6	47.769
1927	6	72.0	.539	6.7	46.098
1928	6	70.8	.488	7.5	50.480
1929	6	72.6	.508	7.8	50.802
1930	6	75.0	.483	7.4	57.840
1931	6	73.0	.462	7.2	52.983
1932	6	73.0	.516	7.3	52.130
15-year average, 1917–31		72.3	.503	7.1	50.453

³⁹ Computed by ratios of Dickinson, Mandan, and Moccasin.

A SURPRISING DECREASE IN RAINFALL AT THE CRITICAL PERIOD FOR CORN

By ANDREW D. ROBB

[Weather Bureau Office, Topeka, Kans.]

The amount of rainfall at the critical period of corn development determines to a great extent the resulting yield. Prof. J. Warren Smith, in his article, The Effect of Weather Upon the Yield of Corn, in the MONTHLY WEATHER REVIEW of February 1914, found that the critical period for corn in Ohio was the 30 days from July 11 to August 10; that is, the rainfall previous to July 11 did not have a very great effect upon the yield of corn and that which fell after August 10 need not be taken very seriously into account. Ohio being in the same lati-

tude as most of the Corn Belt, the critical period of corn in that State would coincide with that of most of the corn-producing area.

At 23 of the 32 first-order stations of the Weather Bureau in the corn-producing area of eastern Kansas and Nebraska, Iowa, Missouri, Illinois, Indiana, Kentucky, and western Ohio, there is a period from July 16 to 29, when the average precipitation drops below that of either the 14 days preceding or the 14 days following. This is shown by the sums of the average daily precipitation,

corrected to the 50-year period, but not smoothed, of these stations, as given in the MONTHLY WEATHER REVIEW, Supplement No. 34. At 8 of the 32 stations the dry period comes in the 14-day period, July 30 to August 12. At 31 of the 32 stations in this section of the country the period when there is normally less rain, July 16–August 12, comes at a time when the corn is capable of using more rain to the greatest advantage.

For these 23 stations where the dry period occurs July 16–29, the average precipitation for the 14-day period, July 2–15, is 1.72 inches; for July 16–29, 1.43 inches; and for July 30–August 12, 1.59 inches. The first 14-day period has 0.30 inch more rain than the second, and 0.13 more than the third. The third period has 0.17 inch more than the second.

Professor Smith also found that when the July rainfall of these 8 States averaged less than 3.4 inches, the average yield of corn per acre was 10 bushels less than when the rainfall averaged 4.4 inches or more. On this proportion of 1 inch of rain increasing the average yield per acre by 10 bushels, since the forepart of July has 0.30 inch more rain on the average than the latter part, it would be an advantage of 3 bushels per acre to have the critical period of corn come 10 to 15 days earlier.

By either planting earlier, or developing an earlier maturing variety of corn, the crop on the 50,000,000 acres that are usually planted to corn in these States could be increased 150,000,000 bushels. At a price of 50 cents per bushel the value of the corn crop would be increased by \$75,000,000.

The period July 16–29 is not only the driest of the 3 periods that have been compared but at most of the stations it is the driest 14-day period of the growing season. At Terre Haute, Ind., it is the driest from January 29 to October 7; at St. Louis, Mo., Springfield, Ill., and Indianapolis, Ind., it is the driest from February 12 to October 7, while at Cairo, Ill., it is the third driest of the year. At

the remainder of the stations it is the driest 14-day period from approximately May 1 to September 1.

TABLE 1.—Average rainfall at critical period of corn
Where the dry period is July 16–29

Stations	July 2-15	July 16-29	July 30-Aug. 12
Topeka, Kans.	2.07	1.80	1.97
Wichita, Kans.	1.62	1.29	1.68
Iola, Kans.	1.81	1.62	1.73
Lincoln, Nebr.	1.84	1.59	1.76
Kansas City, Mo.	2.08	1.65	1.72
St. Joseph, Mo.	1.99	1.36	1.72
Columbia, Mo.	1.68	1.45	1.48
Hannibal, Mo.	1.47	1.30	1.54
St. Louis, Mo.	1.41	1.23	1.33
Sioux City, Iowa	1.76	1.55	1.56
Charles City, Iowa	1.90	1.58	1.64
Keokuk, Iowa	1.66	1.48	1.61
Davenport, Iowa	1.89	1.24	1.56
Chicago, Ill.	1.58	1.44	1.47
Peoria, Ill.	1.73	1.49	1.49
Springfield, Ill.	1.48	1.13	1.40
Cairo, Ill.	1.38	1.20	1.50
Ft. Wayne, Ind.	1.79	1.41	1.63
Royal Center, Ind.	2.05	1.31	1.52
Indianapolis, Ind.	1.76	1.37	1.59
Terre Haute, Ind.	1.55	1.30	1.42
Columbus, Ohio	1.78	1.49	1.67
Lexington, Ky.	1.64	1.60	1.63
Average	1.73	1.43	1.60

Where the dry period is July 30–Aug. 12

Concordia, Kans.	1.50	1.86	1.34
Des Moines, Iowa	1.61	1.66	1.47
Dubuque, Iowa	2.19	1.56	1.45
Springfield, Mo.	1.81	2.03	1.75
Evansville, Ind.	1.66	1.52	1.38
Louisville, Ky.	1.92	1.45	1.41
Dayton, Ohio	1.58	1.43	1.34
Omaha, Nebr.	1.60	1.64	1.51
Average	1.74	1.65	1.41

Where the dry period is July 2–16

Cincinnati, Ohio	1.47	1.49	1.54
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ANALYSES OF THE PRECIPITATIONS AT MOUNT VERNON, IOWA, FOR 1932–33¹

By LEONARD HINES

[Cornell College, Mount Vernon, Iowa, August 1933]

These analyses of the precipitations at Mount Vernon, Iowa, were made in the chemical laboratories of Cornell College by Leonard Hines, under the direction of Dr. Nicholas Knight. There were samples both of rain and of snow.

Mount Vernon is a village of about 1,700 population, exclusive of the college, and is without factories of any kind. The precipitations were collected in clean granite pans, located in an open space, away from any source of contamination and kept in glass stoppered bottles. The samples were always free from color. Under the direction of Dr. N. Knight, the precipitations here have been analyzed continuously for 25 years.

Ordinarily, after the coal fires are started in the fall, the precipitations show a small amount of sulphate. The SO₂ from the sulphur in the coal oxidizes in the air to SO₃. The past 2 years show a much smaller amount of sulphate, merely traces and less during the past year. During these years of the depression, the people have burned wood and much less coal.

We have considered 12 inches of snow the equivalent of 1 inch of rain.

Special pains were taken with the chloride determination. It has been found necessary to make a correction of 3.55 parts per million from the reading to allow for the formation of the color. In each case, 6 drops of the potassium chromate indicator were used.

The precipitations usually occur when the wind is either from the west or the south, which signifies that the salt is carried from the Atlantic Ocean or the Gulf of Mexico.

The phenol sulphonic method was used in the determination of the nitrates. In general, we followed in our analyses the sixth edition of Standard Methods of Water Analysis, published by the American Health Association.

Table 1 gives the parts of the various substances in 1,000,000 parts of the water and table 2 gives the pounds per acre. One inch of rainfall on an acre weighs 226,875 pounds.

¹ See also Analysis of the Precipitation of Rains and Snows at Mount Vernon, Iowa [1931–32], by Williams and Beddow, MONTHLY WEATHER REVIEW, May 1933, vol. 61, pp. 141–142.